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ERNEST A. BEUTLER, ATTORNEY AT LAW
10 RUE MARSEILLE
NEWPORT BEACH, CA 92660

EXAMINER	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/778,338
Filing Date: February 07, 2001
Appellant(s): ADAEDA ET AL.

Kabushiki Kaisha MORIC
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 7, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The amendment after final rejection filed on 12/2/2002 has been entered.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is substantially correct. The addition is are as follows: The Board must also determine if the subject matter of claim 11 is obvious on the Uchiyama, Neumann, Miyao, and Yamamoto.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-11 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,767,601	Uchiyama	6-1998
4,469,970	Neumann	9-1984
5,338,996	Yamamoto	8-1994
6,211,595	Nose	4-2001
4,737,674	Miyao	4-1988

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7 and 9-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites the limitations "the spacing of the poles of the permanent magnets " in line 1, "the number and spacing of the coils" in line 2 and "the circumferential extent" in line 4. There is insufficient antecedent basis for those limitations in the claim. It is not clear what "their number" refers to.

As a result, it is not clear how "their number" and "the number and spacing of the coils" are set. It is neither clear how "the circumferential extent of each of the magnet poles (the magnet electrical angle) lies in the range of 120° to 140° of such relative rotation."

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchiyama in view of Neumann.

Regarding claim 1, Uchiyama shows a rotating machine (Figures 1a and 1b) having a plurality of permanent magnet (8) having alternating pluralities in a circumferential direction at equally spaced intervals and a relatively rotatable associated element (11) having a plurality of armatures (15) around which coil windings (16) are formed, the armatures are formed from a lamination of a plurality of electromagnetic steel plates.

Uchiyama does not show the electromagnetic steel plates having a thickness in the range of 0.25-0.65mm.

Neumann shows electromagnetic steel plates having a thickness in the range of 0.36-0.64mm (column 4, lines 25-28) for the purpose of providing a high strength motor with minimum flux leakage.

Since Uchiyama and Neumann are all from the same field of endeavor; the purpose disclosed by one inventor would have been recognized in the pertinent art of the others.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the electromagnetic steel plates having a thickness in the range of 0.25-0.65mm to make a stator core as taught by Neumann for the purpose discussed above.

Regarding claim 3, it is noted that Uchiyama also shows the machine comprising an electrical generator.

Regarding claim 4, it is noted that Uchiyama also shows the permanent magnets rotating and the coil windings fixed against rotation.

Regarding claim 6, it is noted that Uchiyama also shows an insulating layer (plates being coated) being fixed to at least one surface of each of the electromagnetic steel plates.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uchiyama in view of Neumann as applied to claim 1 above, and further in view of Yamamoto.

Regarding claim 2, the rotating machine of Uchiyama modified by Neumann includes all of the limitations of the claimed invention except for the electromagnetic steel plates interlocked relative to each other by series of partially punched openings

forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between.

Yamamoto shows the electromagnetic steel plate interlocked relative to each other by series of partially punched openings forming holes (9a) and projections (9), which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between for the purpose of making an armature core.

Since Uchiyama, Neumann and Yamamoto are all from the same field of endeavor; the purpose disclosed by one inventor would have been recognized in the pertinent art of the others.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to interlock the electromagnetic steel plates relative to each other by series of partially punched openings forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between as taught by Yamamoto for the purpose discussed above.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uchiyama in view of Neumann as applied to claim 4 above, and further in view of Yamamoto and Nose.

Regarding claim 5, the rotating machine of Uchiyama modified by Neumann includes all of the limitations of the claimed invention except for the electromagnetic

steel plates being interlocked relative to each other by series of partially punched openings forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between, the partially punched openings being provided in each tooth of the stator core.

Yamamoto shows the electromagnetic steel plate interlocked relative to each other by series of partially punched openings forming holes (9a) and projections (9), which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between for the purpose of making an armature core.

Nose shows the partially punched openings forming holes (14) and projections provided in each tooth of the stator core (Figure 4) for the purpose of making an armature core.

Since Uchiyama, Neumann, Yamamoto and Nose are all from the same field of endeavor; the purpose disclosed by one inventor would have been recognized in the pertinent art of the others.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art interlock the electromagnetic steel plates relative to each other by series of partially punched openings forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between and to provide the

partially punched openings forming holes and projections in each tooth of the stator core as respectively taught by Yamamoto and Nose for the purpose discussed above.

Claims 7, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchiyama in view of Neumann as applied to claim 1 above, and further in view of Miyao.

Regarding claim 7, the rotating machine of Uchiyama modified by Neumann includes all of the limitations of the claimed invention except for the spacing of the poles of the permanent magnets and their number and the number and spacing of the coils being set so that if the degree of rotation during which each coil experiences a complete cycle of electrical current is taken as 360 degrees the circumferential extent of each of the magnet poles (the magnet electrical angle) lies in the range of 120° to 140° of such relative rotation.

Miyao shows the magnet electrical angle of the poles of the permanent magnets being set with respect to the rotational axis to be in an electrical angle of 120° for the purpose of reducing cogging torque.

Since Uchiyama, Neumann and Miyao are all from the same field of endeavor; the purpose disclosed by one inventor would have been recognized in the pertinent art of the others.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to set the spacing of the poles of the permanent magnets and their number and the number and spacing of the coils so that if the degree of rotation during which each coil experiences a complete cycle of electrical current is

taken as 360 degrees the circumferential extent of each of the magnet poles (the magnet electrical angle) lies in the range of 120° to 140° of such relative rotation as taught by Miyao for the purpose discussed above.

Regarding claim 9, it is noted that Uchiyama also shows the machine comprising an electrical generator.

Regarding claim 10, it is noted that Uchiyama also shows the permanent magnets rotating and the coil windings fixed against rotation.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uchiyama in view of Neumann and Miyao as applied to claim 10 above, and further in view of Yamamoto.

Regarding claim 11, the rotating machine of Uchiyama modified by Neumann and Miyao includes all of the limitations of the claimed invention except for the electromagnetic steel plate interlocked relative to each other by series of partially punched openings forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between.

Yamamoto shows the electromagnetic steel plate interlocked relative to each other by series of partially punched openings forming holes (9a) and projections (9), which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between for the purpose of making an armature core.

Since Uchiyama, Neumann, Yamamoto and Miyao are all from the same field of endeavor; the purpose disclosed by one inventor would have been recognized in the pertinent art of the others.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to interlock the electromagnetic steel plates relative to each other by series of partially punched openings forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between as taught by Yamamoto for the purpose discussed above.

(11) Response to Argument

Regarding applicant's arguments to the objection of drawings, under 37 CFR 1.83(a) the drawings must show every feature of the invention specified in the claims so that a best search can be made. For the record, the examiner did not ignore the proposed drawing correction made by the applicants and included in Paper No. 5. Instead, Figures 5 and 6 have been approved by the examiner and placed in the application. See Office Action Summary, Paper No. 6, item no. 11. The Proposed Sketch is still objected to because it does not provide "the circumferential extent" and " the range of 120 degrees to 140 degrees" recited in claim 7. See Office Action Summary, Paper No. 6, item no. 10. If the angle that is dependent upon the geometry of the machine and the number of coils and permanents magnet employed, it is not clear how such the angle can not be displayed for a certain geometry of the machine with a certain number of the coils and permanent magnets. The applicants can still

provide a drawing with a randomly chosen geometry of the machine and with a randomly selected number of the coils and permanent magnets.

Before making any responses to the applicant's arguments, the examiner would respectfully like to present to the Board a fact that is well known in the art of motor and generator: the electromagnetic steel plates (also known as laminations) are used in manufacturing both rotor cores and stator cores in order to reduce eddy current loss. This fact is also taught in colleges. The steel plates must also be coated with an insulation layer on the surfaces so that eddy current in one plate cannot flow to other adjacent ones. Please see Kaiser, Electrical Power: Motors, Controls, Generators, Transformer, The Goodheart-Willcox Company, Inc., 1998, p. 311 for "LAMINATION", U. S. Pat. No. 6,043,583 issued to Kurosawa et al., column 3, lines 12-30 and column 5, lines 35-42, and U. S. Pat. No. 3,679,924 issued to Menzies, column 3, lines 54-57. Those references are cited on Form PTO-892, dated 8/23/04.

In addition, it is well known that magnets can be made either permanently or electromagnetically. Permanent magnets and electromagnets are the main components in every motor and generator. They have both advantages and disadvantages. Permanent magnets eliminate the use of coils wound around the magnetic material and a power source but the magnetic field strength cannot be changed. In contrast, electromagnets require coils and a power source but the magnetic field strength can easily be adjusted by changing the amount of current flow in the coils from the power source. This fact is widely taught in colleges and universities around the world. The use of permanent magnets and electromagnets can be found in

Rand (U.S. Patent No. 3,523,204), column 2, lines 57-58 and column 3, line 42 and in Matsui et al. (U.S. Patent No. 4,937,483), column 1, line 26.

The applicant's argument for claim 1 is on the ground that the laminations in Uchiyama are for the core with coil windings while the laminations in Neumann are for the permanent magnets. In fact, the laminations in Neumann are also for the core of the rotor without permanent magnets. Unlike Figure 3A, the embodiment shown in Figure 1 just includes the core without any electromagnets or permanent magnets. It is further noted that both electromagnets and permanent magnets produce magnetic flux. Therefore, besides using laminations for reducing eddy current loss, the thickness of the laminations disclosed by Neumann can be applied to Uchiyama for minimizing flux leakage. Such modification will optimize the electrical efficiency of the generator.

As a result, it is obvious to one having ordinary skill in the art to use the steel plates having thickness in the range of 0.25 mm and 0.65 mm to make the rotor and stator cores in order to obtain an optimum efficiency. In fact, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding applicant's argument for claims 3 and 4, in the art of motor and generator it is well known that the stators and the rotors are interchangeable and they can be switched in order to obtain the desired function (i.e. converting electrical energy to mechanical energy and vice versa.) See attached copies of Jokl, Theory and Design of Synchronous Machines, spring 1993, page 2.

Regarding applicant's argument for claim 6, the laminations are used in the rotor and stator cores for the purpose of reducing eddy current as discussed above. The

laminations are always coated with resin or insulating material. In fact, the term "lamination" speaks for itself. In the art of motor and generator, the laminations mean that the steel plates are coated with a thin insulating layer so that eddy current cannot flow from one steel plate to another. Therefore, the laminations of Uchiyama and Neumann are inherently insulated from each other.

Regarding applicant's argument for claims 2 and 5, it is noted that Uchiyama, Neumann, and Yamamoto show different ways to stack the core plates together. Therefore, it is obvious to one having ordinary skill in the art to use one way or the other to make the core. It is noted that the examiner does not rely on Neumann for the conductors (16) in his Office Action. The examiner relies on Yamamoto for the projections (9) and punched holes (9a).

Regarding applicant's argument for claims 7 and 9-11, although Miyao does not show the spacing, Uchiyama shows the spacing (9) of the permanent magnets (8) and also the spacing (grooves between teeth 15) of the coil windings (16). It is noted that claims 7 and 9-11 do not recite "nonmagnetic spacing" or "air gaps between the magnets" as the applicants imply in the Appeal Brief, page 5, paragraph 5, line 4 and page 6, paragraph 2, line 3, respectively. In contrast to "the spacing of the poles of said permanent magnets" in line 1 of claim 7, the specification of the present application does not show any nonmagnetic spacing or air gaps between the magnets (22). See Figure 2 for rotor (13) with magnets (22) and page 5, second paragraph.

Although claim 7 requires the range of 120 to 140 degrees, Miyao shows a relationship between the rotor poles and the stator poles with 120 degrees. Therefore,

it is obvious to one having ordinary skill in the art to set the relationship between the rotor poles and stator poles of Uchiyama with the range of 120 degrees to 140 degrees for optimum operation.

Regarding applicant's argument for rejection under 35 U.S.C. 112, second paragraph, the Appeal Brief now further confuses the examiner because it implies that there are either nonmagnetic spacing or air gaps between the magnets (22) as shown from paragraph 5, page 5 to paragraph 2, page 6. In contrast, the specification and even the Proposed Sketch show the permanent magnets (22) disposed next together. It seems to the examiner that the limitation "the spacing of the poles of said permanent magnets" not only lacks antecedent basis within the claim but also within the entire specification if "the spacing" means "air gaps between the magnets."

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

DDL
May 25, 2005

Conferees
Dang Le
Darren Schuberg
Brian Sircus

DANG LE
PRIMARY EXAMINER

ERNEST A. BEUTLER, ATTORNEY AT LAW
10 RUE MARSEILLE
NEWPORT BEACH, CA 92660